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(54) Insole with arch support

(57) Insole 6 has a mid portion 5 to which is affixed on its upper surface an arch support made from main member 1; and an auxiliary member 2 which is sandwiched between the insole and the main member. Members 1 and 2 each comprise a thin cellulose fibreboard layer 'c' adhered to a cork particulate board 'b'. The underside of the edges of member 1 are bevelled or chamfered (1e) to provide contact with insole 6 when the main member is secured by tapes 7 and 8. The envelope made by the insole with main member 1 encapsulates auxiliary member 2 and a modest gap 9 around the periphery of member 2. Each cork board layer may typically be about 3 mm deep. In another embodiment (Figure 2, not shown), member 1 comprises just layer 'c', a cellulose fibreboard layer 0.8-1.0 mm thick.

FIG.1 (C)

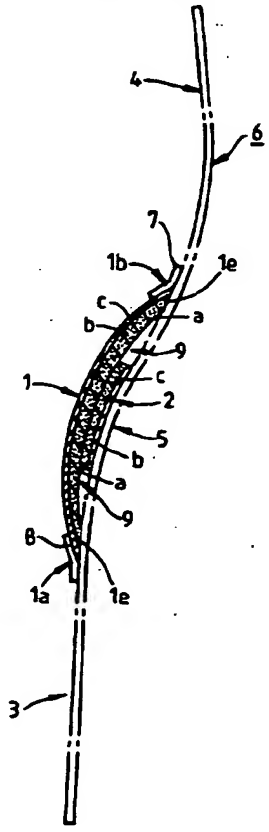

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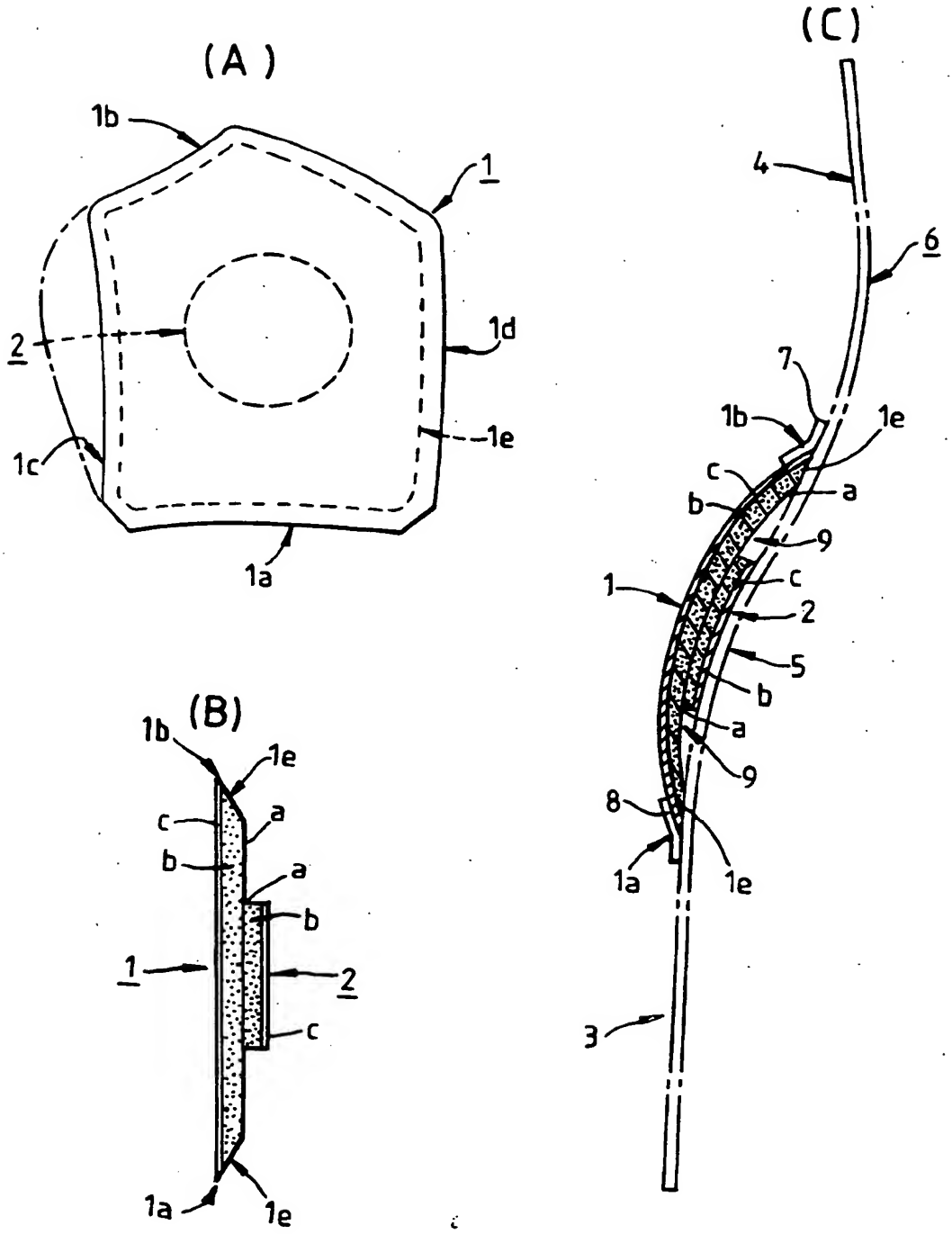
FIG . 1


(A)
1b
1
2
1d
1c
1e
1a
(B)
1b
1e
c
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b
a
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1
2
c
1a
1e
(C)
4
6
7
1b
1e
c
a
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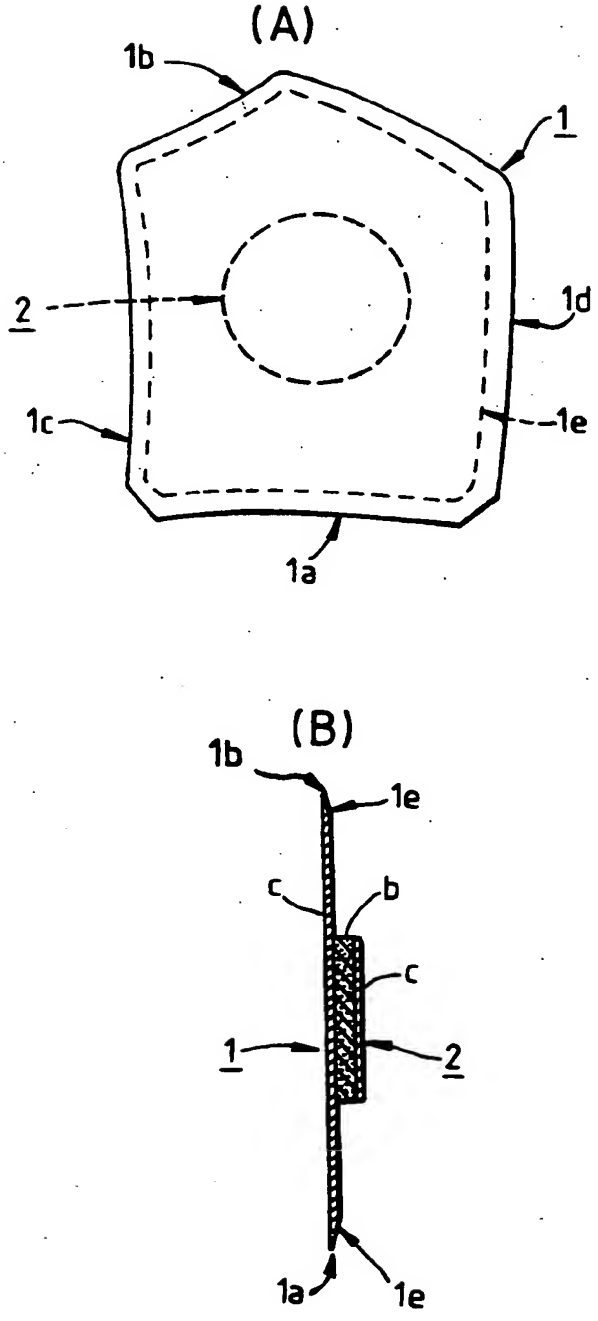
9
1
c
2
5
b
a
9
8
1a
1e
3

FIG . 2



INSOLE FOR USE WITH SHOE

FIELD OF THE INVENTION

This invention relates to an insole for use with a shoe useful for a user of a shoe during standing position and walking position.

BACKGROUND OF THE INVENTION

It is believed that the fitness property (adaptability to foot) and the fashionability of leather made walking shoes are the two important factors to be satisfied by customers. It is noted, however, that the fitness property cannot be realized easily. This is because that, apart from the instep-side of a shoe, the sole-side of a shoe is constructed in very solid manner so as to accommodate variable load of body weight, while a foot of a user repeatedly represents dynamic change in its configuration and size during forward displacement of a load point of body weight.

That is to say, under a load condition, the space between the sole of a user and the shoe insole is reduced to a substantial degree, since the plantar arch of a foot is lowered (see "Human Feet" by Kunitaro Mizuno), and the soft structure (the structure consisting of muscle and skin of the sole) of the sole of a foot approaches the recess of the plantar arch of a foot. It is noted, however, that, under no load condition, the above-mentioned space is increased, since the plantar arch of a foot is raised and the above-mentioned soft structure is returned to its original condition. The width of a foot is also increased under the load condition, since the height of the plantar arch of a foot is lowered so as to cause the plantar arch to be expanded, and since a part of the soft structure of the sole of a foot is displaced laterally due to the load from a body weight. It is noted, however, that, under a no load condition, the width of a foot is decreased.

As will be appreciated from the foregoing, the contact pressure of the intermediate foot-portion at its bottom surface and the side surfaces relative to a shoe is quickly decreased under the no load condition, so that the grip force

of a foot relative to the shoe is more or less decreased. Although it is conceived to make a shoe hanging core narrower, such measure is not satisfactory since a shoe having such a narrow width would not be accepted by most customers.

Thus, in the case of women's shoes having no substantial fastening means at their instep sides, forward slippage and lateral turn of a foot are caused, so that frictional wound and corns may be created in the toe bones and/or the sole of a foot due to repetitive slippage.

Several efforts have been made heretofore in order to avoid the above-mentioned inconvenience. In advanced countries with regard to manufacturing shoes, a variety of metatarsal supports have been developed and utilized at hospitals for curing feet. Recently, shock absorbing ability upon landing of sport shoes is greatly improved due to the occurrence of cellular cushioning materials. In leather made walking shoes, a thin sheet made from a cellular cushioning material is applied as a fit bed to the intermediate foot-portion of an insole. Similarly, such thin sheet is applied as an anti-slip member to the forward foot-portion or the heel portion. Arch supports, heel pads, or fore-part pads molded from a cellular cushioning material are used. It is noted, however, that damages to a foot relating to shoes have not been eliminated.

In conventional leather made walking shoes, follow-up capability of a shoe does not match the dynamic change of a foot of a user during walking. When fitness property is increased, an excessive pressure will be applied to a foot. On the other hand, when the pressure to a foot is decreased, the gripping force becomes insufficient, so that forward displacement and/or lateral turn of a foot are caused, whereby damages to a foot, such as frictional wound, corns and the like are induced.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an insole for use with a shoe, which prevents an excessive pressure from being applied to a foot of a user, which follows up dynamic change of a foot of a user during walking, without

applying any excessive pressure to a foot of a user, so as to always maintain a shoe closely in contact with a foot of a user, and which increases gripping force of a shoe to a foot of a user, so as to prevent occurrence of any forward displacement and lateral turns or the like, whereby preventing a foot from any damages.

The inventor referred to the famous article entitled "Human Feet" by professor Kunitaro Mizuno. As a result, I recognized the effects of various "plays" of foot joints and of the "soft structure" of a sole of a foot (especially, finely partitioned fat and the strong frames of connective tissue enclosing the fat, together with the sole supporting skin which is thick but flexible). I have also recognized that the above-mentioned effects are closely related to the functions of a foot. In order to eliminate injury relating foot, the invention is thought out from the points of view mentioned below.

Specifically, an insole for the plantar arch is fabricated from a cork particle board or the like material which is flexible like the soft structure of the sole of a foot, but has a relatively high rigidity and involves therein "play" element. The thus fabricated insole is able to respond to variable load with the aid of "play" function. Such insole is applied to the plantar arch portion of the body insole of a shoe.

More particularly, the invention provides an insole for use with a shoe having a body insole. The body insole includes a rearward foot-portion having a heel portion, a forward foot-portion having an arrangement for metatarsophalangeal joints of a foot of a user, and a intermediate foot-portion having a plantar arch portion. The intermediate foot-portion is disposed between the rearward foot-portion and the forward foot-portion of the body insole. The insole comprises a main support plate member and an auxiliary support member. The main support plate member is adapted to be secured to the upper surface of the intermediate foot-portion of the body insole. The main support plate member includes a forward edge, a rearward edge,

a left-hand side edge, and a right-hand side edge. The forward edge of the main support plate member is located at a position forwardly of the base of metatarsus bone portion on the intermediate-foot portion. The rearward edge of the main support plate member is located at a position forwardly of the heel portion of the rearward foot-portion. The width between the left-hand and right-hand side edges of the main support plate member is substantially equal to or slightly greater than the width of the intermediate foot-portion of the body sole. The side edges of the main support plate member extends substantially along the corresponding side edges of the body insole. The main support plate member is chamfered along the periphery around its lower surface into a tapered configuration. The auxiliary support member is secured to the lower surface of the main support plate member at its central portion, so as to increase the thickness of the main support plate member at its central portion to form a central convex portion, and so as to form free spaces between the periphery around the lower surface of the main support plate member and the upper surface of the body insole. The auxiliary support member is located substantially at the central portion of the plantar arch portion of the intermediate foot-portion of the body insole, whereby a support pressure is always applied to the plantar arch of a foot of a user by means of the central convex portion of the main support plate member, so as to obtain a full-face contact capability.

According to one embodiment, the main support plate member is defined by a forward half-portion and a rearward half-portion which are oppositely disposed with respect to the transverse mid-line of the auxiliary support member. The forward half-portion and the rearward half-portion are bent downwardly with regard to the horizontal mid-line of the auxiliary support member, whereby the insole is so reformed that the chamfered tapered surfaces of the forward edge and the rearward edge of the main support plate member are smoothly contacted in a face to face relationship with the upper surface of the body insole. The auxiliary support

member is then fixedly bonded to the upper surface of the plantar arch portion on the intermediate foot-portion of the body insole, whereby the main support plate member and the auxiliary support member in a curved configuration are integrally secured to the body insole.

According to one embodiment, when a user puts on the shoes with the insole, the entire surface of the plantar arch portion, especially the central portion of the arch portion is contacted by the central convex portion of the main support plate member made by the auxiliary support member, with providing a user feeling of being supported. When the weight of a user is applied to the central convex, the free spaces under the main support member are deformed to be reduced and the weight of a user is supported by the entire area of the plantar arch portion. When the weight of a user is not applied to the central convex, the free spaces expand and restore the original state, thereby the convex portion closely contacts to the entire surface of the plantar arch portion and shoe support condition is securely maintained. Accordingly, the forward slippage and lateral turn of a foot are prevented and shoe holding ability by a foot is securely maintained.

In one embodiment, the main support plate member and the auxiliary support member are formed from a laminated plate. The laminate plate includes a cork particle board layer of a thickness of about 3 millimeters, a very thin nonwoven fabric covering the rear surface of the cork particle board layer, and a cellulose fiber board of a thickness of about 0.8 to 1.0 millimeters press-bonded to the front surface of the cork particle board layer.

The cork particle board layer is flexible like the soft structure of the sole of a foot, but has a rigidity slightly greater than that of the soft structure. The cork particle board layer also has "play" element therein. Thus, the cork particle board layer is preferable to be used as a support material for the plantar arch portion including the plantar arch. It is noted, further, that the cork particle board layer is coated on its rear surface with a very thin nonwoven

fabric, so as to prevent dislodgment of cork particles. A cellulose fiber board is press-bonded to the front surface of the cork particle board layer, so that the rigidity of the front surface of the cork particle board layer is increased, regardless of the flexibility of the cork particle board layer, and so that support pressure to the plantar arch (reaction force against a floor) may be efficiently exerted.

The main support plate member and the auxiliary support member may be integrally formed from a laminated plate including a cork particle board layer, a very thin nonwoven fabric applied to the rear surface of the cork particle board layer, and a cellulose fiber board press-bonded to the front surface of the cork particle board layer.

The main support plate member may be fabricated merely from a cellulose fiber board which is chamfered at the periphery around the lower surface thereof into a tapered configuration, while the auxiliary support member may be fabricated from a laminated plate including a cork particle board layer and a cellulose fiber board which are press-bonded together.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:

Fig. 1(A) is a plan view showing an insole for use with a right-hand shoe according one embodiment of the invention;

Fig. 1(B) is a right-hand side view of the insole shown in Fig. 1(A);

Fig. 1(C) is a longitudinal cross-sectional view showing the insole of the invention mounted on the plantar arch portion of a body insole of a shoe;

Fig. 2(A) is a plan view showing an insole for use with a right-hand shoe according to another embodiment of the invention; and

Fig. 2(B) is a longitudinal sectional view showing the insole shown in Fig. 2(A).

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An insole for the plantar arch (the arch of a foot) according to the invention comprises, as shown in Figs. 1A and 1B, a main support plate member 1 and an auxiliary support member 2. The main support plate member 1 and the auxiliary support member 2 each consists of a laminated plate (the larger laminated plate constitutes the main support plate member 1 and the smaller laminated plate constitutes the auxiliary support member 2). The laminated plate includes a layer b of cork particle board, a very thin layer a of nonwoven fabric (the thickness thereof is not shown in the drawing since it is quite thin) which covers the rear surface of the layer b, and a cellulose fiber board c press-bonded to the front surface of the layer b. The cork particle board layer b has a thickness of about 3 millimeters. The cellulose fiber board c has a thickness of about 0.8 to 1.0 millimeters. The cork particle board layer b has a rigidity greater than that of the soft structure of the plantar arch (the arch of a foot). It is noted, however, that the cork particle board layer b has, by nature, a relatively low impact resilience, so that it may be easily deformed. It is further noted that the cork particle board layer b tends to cause therein residual strain due to repetitive compression.

The main support plate member 1 consisting of the larger cork particle board layer b is configured, as shown in Fig. 1(C) so as to be contacted with the mid-portion (intermediate foot-portion) 5 intermediate the aft-portion (rearward foot-portion) 3 and the fore-portion (forward foot-portion) 4 of a foot. The aft-portion 3 includes the heel of a foot the skin of which is hardened and thickened. The fore-portion 4 includes the contact portion and the tread portion of the metatarsophalangeal joint of a foot. The mid-point 5 includes the plantar arch of a foot the skin of which is relatively soft and thin. The aft-side 1a is slightly recessed inwardly in accordance with the curvature of a round protrusion of the heel. The fore-side (forward edge) 1b is slightly angled rearwardly from the contact portion of the metatarsophalangeal joint (i. e., toward the

front portion of the base of the metatarsus bone), taking account of a possible big bulge in the fore-aft direction (forward-rearward direction) of the metatarsophalangeal joint during extension thereof. The inner side (inner edge) 1c and the outer side (outer edge) 1d are configured in accordance with the edges of a insole (body insole) 6 of a shoe so as to have a length of 65 millimeters along the longitudinal mid-line and a length of 50 millimeters along the transverse mid-line (assuming that the insole for a plantar arch is used with a shoe of a size of 23.5 centimeters). It is preferable that the inner-side 1c of the main support plate member 1 be slightly protruded outwardly from the edge of the insole of a shoe, as shown by the dotted line in Fig. 1(A), so as to realize a total contact (contact over the entire area of the plantar arch).

The smaller or auxiliary support member 2 is formed by cutting the above-mentioned laminated plate into a circular configuration. In this regard, it is noted that the ratio of surface area between the main support plate member 1 and the auxiliary support member 2 is usually 6 to 1.

The main support plate member 1 is chamfered at its backside portion (i. e., the side on which the very thin nonwoven fabric a is mounted) over the entire periphery by diagonally cutting the cork particle board layer b by the width of about 6 millimeters so as to form a taper portion 1e. The backside surface of the auxiliary support member 2 is securely bonded to the backside surface of the main support plate member 1 at its central portion. By this, an insole for the plantar arch is completed. It is particularly noted that the plantar arch insole (the insole for the plantar arch) should be reformed to a substantial degree before it is assembled with a main insole (the insole of a shoe). Such reforming operation may be performed by utilizing the characteristic property of the cork particle board (i. e., the cork particle board may be easily deformed to cause residual stress therein due to repetitive compression, although it has a certain degree of rigidity). Specifically,

the fore-halve and the aft-halve of the entire support portion are forcibly pressed downwardly about the transverse mid-line of the auxiliary support member 2 of a diameter of 25 millimeters, so as to cause them to be deflected to form a curved plate. Thus, the fore-side 1b and the aft-side 1a, which have been formed by diagonally cutting the cork particle board layer b into the taper portion 1e, and the oblique surface of the cellulose fiber board layer c may be smoothly contacted with the upper surface of the main insole 6 of a shoe, when the front surface of the auxiliary support member 2 is adhesively secured to the main insole of a shoe.

The auxiliary support member 2 of the curved plate is so oriented that its front surface faces downwardly. Then, the curved plate is adhesively secured to the mid-portion 5, including the plantar arch portion of the main insole 6 of a shoe, at its central position (this position is achieved by placing the mid-point of the aft-side 1a of the main support plate member 1 at the position which is distant 60 millimeters from the backward end of the main insole of a shoe, when the shoe is of a 23.5 centimeter-size). The fore-side 1b and the aft-side 1a, which have been already contacted in face to face relationship with the upper surface of the main insole 6 of a shoe due by reason of the above-mentioned reforming operation, are adhesively secured to the main insole 6 of a shoe by extending single-sided fabric tapes 7, 8 from the surface of the main support plate member 1 onto the main insole 6 of a shoe, as shown in Fig. 1(C). Thus, the plantar arch insole of the invention is formed into a curved or arched configuration (having the difference of elevation of about 7 millimeters) which is adapted to be easily conformed to the curvature of the plantar arch. Such plantar arch insole is capable of accommodating a dynamic deformation of the plantar arch of the sole of a user, so as to freely perform the "total contact(totally planar contact)", due to the presence of free spaces 9 around the auxiliary support member 2, as well as free edges (the edges which are not fixed) of the inner and outer sides 1c, 1d. It is noted that the procedure of securing the plantar

arch insole of the invention to the upper surface of the main insole is performed after the final step in shoe manufacturing in which a hanging core is withdrawn. Thereafter, various finishing procedures are performed which are usually carried out relative to common leather shoes, in order to improve fitness feeling of a foot. Such finishing procedures include the procedure of applying softening materials such as felt and/or even softer natural leather on the entire upper surface of the plantar arch insole. It is therefore possible to obviate the tapes 7, 8 which serve to depress the fore-side 1b and the aft-side 1a of the main support plate member 1.

The fore-side 1b of the main support plate member 1 was intentionally deformed into an "angled configuration" as mentioned above. This permits moderate positioning of the fore-side 1b, in an "angled configuration", in accordance with the angled orientation of the five metatarsophalangeal joints disposed forwardly of the fore-side 1b. By this, high degree of footwork, such as plantar flexion including downward movements of the metatarsophalangeal joints, and dorsiflexion including upward movements of the metatarsophalangeal joints are permitted.

As mentioned above, the cork particle board layer b causes therein residual strain due to repetitive compression. Thus, when the upper-most plate of the main insole 6 of a shoe is also fabricated from a laminated plate of a cork particle board and the plantar arch insole of the invention is placed thereon, a recessed deformation due to repetitive compression is caused in the fore-portion 4 including the tread portion and the aft-portion 3 including the heel portion of the main insole 6. Accordingly, fitness feeling over the entire sole may be further improved.

As a measure for a user having fallen arches (flat feet), the main support plate member 1 may be fabricated merely from the cellulose fiber board c. In such a case, the auxiliary support member 2 is constructed from a laminated plate consisting of the cork particle board layer b and the

cellulose fiber board c, the layer b and the board c being bonded together by means of a press operation. The auxiliary support member 2 is secured to the main support plate member 1 at its substantially central portion in a manner similar to that mentioned above. By this, the support height for the plantar arch of a foot is preferably reduced, so as to prevent any excessive pressure from being applied to the plantar arch of a foot. In this case, the "free" spaces are also created around the auxiliary support member 2, so as to provide the function similar to that of the example shown in Fig. 1. The cellulose fiber board c constituting the main support plate member 1 as shown in Figs. 2(A) and (B) has a thickness of about 0.8 to 1.0 millimeters. The cork particle board layer b and the cellulose fiber board c of the auxiliary support member 2 each has a thickness similar to that of the embodiment shown in Fig. 1.

ADVANTAGES OF THE INVENTION

According to the shoe insole of the invention, the main support plate member causes constrictive deformation of the free spaces around its lower surface, when a body weight of a user is applied thereto, so as to support the body weight for distributing the body weight over the entire area of the plantar arch of a user. When the body weight is not applied to the shoe insole, the shoe insole causes the free spaces to be expanded to their original condition and is closely contacted with the entire area of the plantar arch of a user, so as to maintain the support attitude. Thus, the insole of the invention always applies, in a flexible manner, a support pressure to the plantar arch of a foot in accordance with the dynamic deformation of the plantar arch of the sole of a foot, and becomes to be contacted in face to face relationship with the plantar arch. Accordingly, occurrence of spaces below and laterally of the plantar arch during walking may be minimized, so that sufficient shoe-gripping force of a foot is obtained. By this, any damage or injury to the bones of digit of foot or sole due to repetitive friction between the foot and shoe may be effectively prevented.

The insole for the plantar arch of a foot according to the invention serves to effectively support, in a flexible manner, the inner and outer longitudinal arches of foot, in accordance with the dynamic change of the plantar arch during walking, thus assisting in the support ability of the longitudinal arches for a body weight. The cellulose fiber board, provided on the surface of the insole and performing the "total contact", serves to repeatedly stimulate various bones and joints constituting the longitudinal arches, various ligaments, aponeurosis of the sole, tendons and muscles relating to the longitudinal arches for supporting a body weight, so as to improve the function of the longitudinal arches to support a body weight. In this regard, it is to be noted that some researchers point out that legs and/or feet of most Japanese have been weakened, due to the modernization of life.

Finally, the insole of the invention provides another healthful advantages. It is known that the shallow layer and the deep layer of the soft structure of plantar arch of the sole of a foot contain therein various blood vessels extending from the upper part of a body, the crus and the rearward foot-portion to the forward foot-portion, rami of nerves, flexors, extensors, short muscles, tendons, membranes and ligaments. In this regard, it is to be noted that the cellulose fiber board having a sufficient rigidity is mounted on the surface of the insole. The cellulose fiber board is in contact with the entire surface of the plantar arch of a foot. In the plantar arch of a foot, the skin is thinner, and the fat and muscle are thicker and softer, when compared with those in the heel portion and tread portion. The cellulose fiber board serves to effectively actuate the physiological functions of the above-mentioned organs. For example, the muscle of the sole of a foot is stimulated by means of the support pressure exerted from the insole of the invention to actuate the milking action relative to veins, so as to improve circulation of blood, so that the blood circulation ability of the heart is facilitated.

It will further be obvious to those skilled in the art

that many variations may be made in the above embodiments, here chosen for the purpose of illustrating the present invention, and full result may be had to the doctrine of equivalents without departing from the scope of the present invention, as defined by the appended claims.

CLAIMS

1. An insole for use with a shoe having a body insole, the body insole including a rearward foot-portion having a heel portion, a forward foot-portion having an arrangement for metatarsophalangeal joints of a foot of a user, and a intermediate foot-portion having a plantar arch portion, the intermediate foot-portion being disposed between the rearward foot-portion and the forward foot-portion of the body insole, the insole comprising a main support plate member and an auxiliary support member,

the main support plate member being adapted to be secured to the upper surface of the intermediate foot-portion of the body insole,

the main support plate member including a forward edge, a rearward edge, a left-hand side edge, and a right-hand side edge,

the forward edge of the main support plate member being located at a position forwardly of the base of metatarsus bone portion on the intermediate-foot portion,

the rearward edge of the main support plate member being located at a position forwardly of the heel portion of the rearward foot-portion,

the width between the left-hand and right-hand side edges of the main support plate member being substantially equal to or slightly greater than the width of the intermediate foot-portion of a foot of a user,

the side edges of the main support plate member extending substantially along the corresponding side edges of the body insole,

the main support plate member being chamfered along the periphery around its lower surface into a tapered configuration,

the auxiliary support member being secured to the lower surface of the main support plate member at its central portion, so as to increase the thickness of the main support plate member at its central portion to form a central convex portion, and so as to form free spaces between the periphery

around the lower surface of the main support plate member and the upper surface of the body insole,

the auxiliary support member being located substantially at the central portion of the plantar arch portion of the intermediate foot-portion of the body insole, whereby a support pressure is always applied to the plantar arch of a foot of a user by means of the central convex portion of the main support plate member, so as to obtain a full-face contact capability.

2. The insole for use with a shoe according to Claim 1, wherein the main support plate member is defined by a forward half-portion and a rearward half-portion which are oppositely disposed with respect to the transverse mid-line of the auxiliary support member, the forward half-portion and the rearward half-portion being bent downwardly with regard to the horizontal mid-line of the auxiliary support member, whereby the insole is so reformed that the chamfered tapered surfaces of the forward edge and the rearward edge of the main support plate member are smoothly contacted in a face to face relationship with the upper surface of the body insole,

the auxiliary support member being fixedly bonded to the upper surface of the plantar arch portion on the intermediate foot-portion of the body insole, whereby the main support plate member and the auxiliary support member in a curved configuration are integrally secured to the body insole.

3. The insole for use with a shoe according to Claim 1 or 2, wherein the forward edge of the main support plate member is angled toward the base of metatarsus bone portion of the intermediate foot-portion.

4. The insole for use with a shoe according to any one of Claims 1 to 3, wherein the main support plate member and the auxiliary support member are formed from a laminated plate, the laminate plate including a cork particle board layer of a thickness of about 3 millimeters, a very thin nonwoven fabric covering the rear surface of the cork particle board layer, and a cellulose fiber board of a

thickness of about 0.8 to 1.0 millimeters press-bonded to the front surface of the cork particle board layer.

5. The insole for use with a shoe according to any one of Claims 1 to 3, wherein the main support plate member and the auxiliary support member are formed from a laminated plate, the laminate plate includes a cork particle board layer, a very thin nonwoven fabric covering the rear surface of the cork particle board layer, and a cellulose fiber board press-bonded to the front surface of the cork particle board layer.

6. The sole for use with a shoe according to any one of Claims 1 to 3, wherein the main support plate member is fabricated merely by a cellulose fiber board, the periphery around its lower surface being chamfered into a tapered configuration, and wherein the auxiliary support member is fabricated by a laminated plate, the laminated plate including a cork particle board layer and a cellulose fiber board which are press-bonded together.

7. An insole for use with a shoe having a body insole substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

8. An insole for use with a shoe having a body insole substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.

The Patent Office

Application No:	GB 9720940.7	**Examiner:**	Jeremy Philpott
Claims searched:	1-8	**Date of search:**	9 December 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): A3B

Int Cl (Ed.6): A43B: 7/14, 7/22, 7/24, 7/28, 13/38, 13/40; A61F 5/14

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	GB 879227	(The Scholl Mfg. Co. Ltd.) whole document and Figures.	
A	GB 871504	(The Scholl Mfg. Co. Ltd.) whole document, note Fig 26.	
A	US 4503576	(Dennis N. Brown) whole document and Figures	
A	US 4316333	(Harvey Rothschild) whole document and Figures	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.